## Space Weather Forecast

Issued on Wednesday, 20 July 2022 at 01:24 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

**Space Weather Forecast Headline: G1/Minor Storms likely with coronal hole fast wind arrivals, most likely day 3 (22nd). Chance of Moderate flares (R1-R2 Radio blackouts).**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Low over the last 24 hours, with only stable and inactive sunspots on the visible disc and low level Common-class flares, although some growth in small sunspots has been observed in the northeast quadrant. No Earth-directed CMEs (coronal mass ejections) have been observed on available imagery.

**Solar Wind / Geomagnetic Activity:** The solar wind as observed at L1 was indicative of a CME arrival. Solar wind speeds were slightly elevated, mainly at 420-500 km/s, but peaking at around 525 km/s around 19/1200 UTC. The magnetic field strength was moderate to weak and variable at first, before then smoothly and gradually declining. The important north-south direction was also initially variable, but became persistently negative (southward pointed) from 19/0400 UTC and then smoothly weakened. Geomagnetic activity was Unsettled to Active with one G1/Minor Storm interval (19/1200-1500 UTC)

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Solar activity is forecast to be Low, with a chance of rising to Moderate from any Moderate flares that occur due to the number of sunspot regions on the visible disc.

**Solar Wind / Geomagnetic Activity:** There are no Earth-directed CMEs. Current elevated solar winds are expected to ease day 1 (20th) and day 2 (21st) before a further enhancement is possible late day 2 or more likely day 3 (22nd). This is due to the arrival of fast winds from two large coronal holes on the Sun. Initially Unsettled to Active geomagnetic activity, becoming Quiet, isolated Unsettled later day 1 (20th). This then increasing to Unsettled to Active with isolated G1/Minor Storm intervals likely later day 2 or day 3 (21st or 22nd) due to the fast wind arrivals. Activity easing back to Quiet to Unsettled day 4 (23rd).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) may increase due to any flares that occur, however there is only a very slight chance of reaching the level of a solar radiation storm.

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Met Office

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | Yes | 10 | 30 | 60 | 10 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | No | 25 | 25 | 20 | 20 |
| Very Active | R3 to R5 X | No | 1 | 1 | 1 | 1 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 2 | 2 | 2 | 2 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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